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THE FIRST AND ONLY ATOM[illegible] SERVICE

ROBERT M. SHERMAN, EDITOR. PUBLISHED BI-WEEKLY BY ATOMIC ENERGY NEWS, INC., 509 FIFTH AVENUE, NEW YORK 17, N. Y.

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Dear Sir:

Following the fifth and last of the present series of nuclear detonations at the gunnery range last week near Las Vegas, Nev., it was disclosed by Senator Brien McMahon in Washington that the tests had resulted in new and important knowledge for military strategy and tactics. Senator McMahon, chairman of the Joint Congressional Committee on Atomic Energy, spoke of experimentation concerning a variety of atomic weapons, rather than concentration upon one type. (It is believed the types used in Nevada were designed to extend the use of the atomic bomb from purely strategic to tactical purposes, with each of the five explosions testing a different model, and each designed for a different purpose. Small amounts of deuterium or tritium may have been incorporated in one or more of the five models, to reveal the behavior of these heavy hydrogens in an atomic explosion.)

Monsanto Chemical Company revealed last week that it has already started gathering a staff to investigate the use of nuclear energy for plutonium and power production, on a private basis (AEN: 1/30/51, p.1). The USAEC's permission has been given, Charles Allen Thomas, Monsanto vice-president stated, for the first or investigative step. (Steps to follow would be the design of the power and plutonium plant, and its construction.) The entire cost of this first step will be borne by Monsanto, which would be willing to include as a partner in a syndicate any other interested industrial firm. Preferably it would be an electric company, Thomas declared, since the handling and moving of electrical capacity would be involved.

Initial spending for construction at the USAEC's new installation at the Pantex ordnance plant, near Amarillo, Texas, will be between one and one-half million dollars. A four-phase construction project, the work will include shops, an administration building, insulated steel frame ramps, and rehabilitation of existing ramps. Plans and specifications may be requested, by interested contractors, through March 12th, from the USAEC's Santa Fe, N.M., Operations Office.

New agreements have been made by Great Britain, Canada and the United States covering the development, use, and exchange of information on atomic energy, Prime Minister Attlee told the House of Commons in London last fortnight. Under the World War II agreement, there had been full exchange of information. Later, under the Atomic Energy Act of 1946, there had been set up nine areas of non-weapon cooperation, which tended to limit the U.S.'s exchange of classified data with Canada and Britain. The effect of the new agreement is to enlarge the amount of classified atomic weapon engineering data which will be available to Britain and Canada from United States sources.

A realignment of boundary lines, at the site selected some 20 miles southeast of Augusta, Ga., for the USAEC's new tritium production plant, will remove some 10,000 to 20,000 acres from the original 250,000 acre project area. The decision was made following completion of certain engineering studies by E.I. du Pont de Nemours & Co., who hold the prime USAEC contract to build and operate the plant.

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PROGRESS REPORT: NUCLEAR ENERGY IN THE UNITED STATES, JULY-DEC. 1950

In its ninth semi-annual accounting for its stewardship of nuclear energy work in the United States, the U. S. Atomic Energy Commission has stressed its concern with weapons, as well as with reactor development and research.

Continued progress was made (the Commission said), on atomic weapons, while preparations for full scale weapons tests at Eniwetok Atoll, in the Marshall Islands, were underway. (Meanwhile, five nuclear detonations at the U.S. proving ground near Las Vegas helped lay groundwork for the Eniwetok tests.)

The emphasis was on permanent replacements for the wartime temporary structures at Los Alamos Scientific Laboratory, as well as at Oak Ridge, and at Hanford Plutonium Works, Richland, Washington.

At the Reactor Testing Station, Arco, Idaho, the experimental breeder reactor, the land based prototype submarine reactor, the materials testing reactor, and the ship propulsion reactor--all of which will ultimately be operated there--received continuing attention.

A change in contractual status took place in the Aircraft Nuclear Propulsion Project (ANPP). The USAEC took over from the U. S. Air Force its contract arrangements with Fairchild Engine and Aircraft Co., for a part of the Nuclear Energy for Propulsion of Aircraft Project (NEPA) at Oak Ridge. (Fairchild have held the prime NEPA contract--a cost-reimbursement operation--for some years now. Under Fairchild are a group of aircraft engine manufacturers; all are engaged in research studies in propelling aircraft by nuclear means. The overall project, ANPP, includes both NEPA and the multitude of activities allied to the work.)

In the fields of biology and medicine (the Commission stated), research to the extent of $22,100,000.00 was financed during 1950, by the USAEC, excluding outlays for new buildings and equipment. Breaking this down showed the following sums allotted: $1,400,000.00 for specific research in cancer; $6,600,000.00 for medical research; $9,500,000.00 for biological research; $3,600,000.00 for biophysics research; and $1,000,000.00 for special training and fellowships.

The USAEC's $25,000,000.00 construction program to provide special laboratories and equipment for studies in the life sciences was approximately one-half completed by the end of 1950; eighteen months should see the completion of the remainder of it. The construction includes: $1,500,000.00 for the University of Rochester's Atomic Energy Project; $1,300,000.00 for the Hanford Biology Laboratory, at Richland, Wash.; $4,300,000.00 for the Argonne National Laboratory cancer hospital, at the University of Chicago; $5,400,000.00 for Argonne National Laboratory, near Chicago; and $2,000,000.00 for the Los Alamos Scientific Laboratory, N.M. $2,000,000.00 was also allotted to the Atomic Bomb Casualty Commission, studying the medical and other aspects of the Hiroshima and Nagasaki atomic bombings.

Concerning research studies which it sponsors, on the toxicity of uranium and plutonium, the Commission stated that research on uranium has answered most of the important questions about its toxic and radioactive effects on people. For this reason, research on uranium was curtailed, and greater effort put into studies on plutonium. It feels that three years work, at present levels, should bring knowledge about plutonium to the level of knowledge about uranium. (The Commission notes that, on the basis of the limited investigation it has so far conducted, plutonium may be less toxic than was originally indicated.)

Advances have been made (the Commission said), in the study and treatment of burns and radiation poisoning caused by atomic explosions. Studies have been conducted along these lines at the University of California (Los Angeles), where small animals were subjected to tests in an apparatus designed to simulate atomic explosion conditions.

BOOKS & OTHER PUBLICATIONS...in the nuclear field....

Radiation Monitoring in Atomic Defense, by D. E. Gray and J. H. Martens. A non-technical guide book for civil defense people, and those charged with radiological monitoring responsibilities. 122 pages.-- D. Van Nostrand Co., New York 10, N. Y. ($2.00)

We of Nagasaki, by Takashi Nagai. An eye-witness account of the atomic bombing of Nagasaki as told by a group of eight survivors. The spiritual, psychological, and physical effects of the atomic bomb on its victims. 189 pages.-- Duell, Sloan & Pearce, Inc., New York 16, N. Y. ($2.75)

NEW PRODUCTS, PROCESSES, & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS- Model 3602 Fume Hood, for handling radioactive isotopes. (Replaces this manufacturer's Oak Ridge approved Model 3600 Fume Hood.) A low velocity hood operating at a 50 lin. ft. per minute air flow through the face of the hood. Design of curved members at face of hood allows air to enter the hood without turbulence. Air foil directional vane at front of hood directs the flow of air across the surface of the hood so that heavy gases are removed. Entire interior of hood fabricated of type 304 stainless steel with a 2B finish. Exterior of hood, and cabinetwork below the working surface, of cold rolled steel. Bonderized with a no. 33 gray baked enamel finish. Working surface rests on steel grating and can carry a weight of 400-lbs/sq. ft.--Kewaunee Mfg. Co., Adrian. Mich.

Low Range Pocket Chamber, Model L-65. For personal protection. Reads the integrated dose of X-rays and gamma rays in the range from 0-200 mr. Clips into the pocket like a fountain pen. Size: 3½" long and ½" in diameter. All parts of plastic. Accuracy of plus or minus 5%; background leakage less than 2% of full scale per day. Calibration independent of the energy of the radiation that is being measured, within close limits, in the range from 75 KV to 1.5 Mev.--Landsverk Electrometer Co., Cincinnati 31, Ohio.

Finger Chamber, Model L-66. Will show actual exposure to the hands; for X- and gamma rays. Range: 0-2.0 roentgens. Size: 1 9/16" long and ½" in diameter. Weight: 1/6 oz. Hermetically sealed. Not affected by humidity of the air or changes in air pressure. Calibration is independent of the energy of the radiation that is being measured, within close limits, in the range from 75 KV to 1.5 Mev. Can also be furnished with clip or bead chain mountings..(A high range chamber, Model L-67, has a full scale reading of 20.0 roentgens. It is identical in external appearance to the Model L-66, above, except for a colored band about the barrel to identify it.).....Charger and Reader, Model L-60, for Models L-65, L-66 and L-67, as above. A battery operated unit, weighing with batteries two pounds, with case of black plastic. Reticle of microscope marked from 2 to 200 mr in twenty equal divisions. When the L-66 and L-67 chambers are read, the indicated readings are multiplied by 10 and 100 respectively. The L-65 chambers read directly.....Landsverk Electrometer Co., Cincinnati 31, Ohio.

Cockcroft-Walton generators. For nuclear physics studies. Capable of delivering up to 400 KV D. C. at 10 MA. A motor generator set operating at 400 cycles permits the use of capacitors considerably smaller than 60 cycle operation would allow. Operating frequency is low enough to eliminate the problem of stray capacitance prevalent at RF operating frequencies; thus, a compact design is achieved.--Beta Electric Corp., New York 29, N. Y.

Alpha-beta-gamma survey meter, Model K-360. Designed specifically for civil defense radiological monitoring. Minimum battery life of 500-hours. Range, 0.005 to 500 roentgens per hour. Pistol shape; size 5" x 6" x 1 1/4". Weight: 14 oz. Immersion proof.--Kelley-Koett Instrument Co., Cincinnati 14, Ohio.

NEWS & NOTES- Foote Mineral Co., Philadelphia, has recently stated that it is under contract to produce zirconium, for the USAEC, for experimental purposes. Foote, long time producer of zirconium, will allocate its entire output of the metal to the USAEC, with the exception of the amounts it will provide for radio tube manufacturers. (Zirconium has a very low tendency to absorb slow neutrons, and the relatively high melting point of 1,860 degrees C., as well as corrosion resistance and ease of formability. This has made it of interest in the field of nuclear energy.)

The absolute air filter, developed by Arthur D. Little, Inc., Cambridge, Mass., consulting research and engineering firm, and used by the USAEC to prevent contamination of air by radioactive particles, will shortly be made available to industry for special high efficiency air filtering, that firm has announced. Bruce D. Old, former part time consultant to the USAEC, and with Arthur D. Little since 1946, has now been made a vice president of that concern.

ATOMIC PATENT DIGEST...latest U.S. applications & grants...

GRANTS-Ion vacuum gauge. In an ionization pressure gauge, the method of controlling the ionizing means, and the method of substituting a separate voltage source for the derived voltage, in the controlling means, to check the accuracy of the regulation. U. S. Pat. No. 2,537,775, issued Jan. 9, 1951; assigned to United States of America (USAEC).

Combination beta and gamma chamber. A monitoring device for measuring the radioactivity of fluids. Comprises a housing with a tubular element passing through it, which provides a passage for the continuous flow of fluids. (This tubular element is transparent throughout to the passage of gamma radiation, while retarding beta radiation. The element also has an intermediate portion transparent to beta radiation.) Means are also provided which are selectively responsive to the gamma and the beta radiation from the fluids, and which provide a measure of their intensity. These means include chambers within the housing. U. S. Pat. No. 2,538,632, issued Jan. 16, 1951; assigned to United States of America (USAEC).

Radiographic inspection apparatus. A jig for positioning radiation emanating material in the radiographing of cylindrical pipe joints. U. S. Pat. No. 2,539,102, issued Jan. 23, 1951; assigned to Bechtel Bros. McCone Co. (Delaware corporation.)

Non contacting thickness gauge. A gauge of the type in which two beams of penetrating radiation are directed through a standard and through a sample to be examined. Comprises a common source for two such beams of penetrating radiation, suitable radiation detection means, and associated radiation-responsive circuits of a type which provide electric signals related in magnitude to the radiation indicated upon the detector. U. S. Pat. No. 2,539,203, issued Jan. 23, 1951; assigned to General Electric Co., Schenectady, N.Y.

Rare earths separation by adsorption and desorption. Comprises contacting an acqueous solution containing water soluble inorganic salts of rare earths with a cation exchange resin to adsorb rare earths on the resin. Through a column of the adsorbed resin is then passed an acqueous solution containing from 0.05% to 5% citric acid, having a pH from 2.5 to 7.0. The eluate is then passed through a column of cation exchange resin, and successive portions of the resultant eluate are collected. U. S. Pat. No. 2,539,282, issued Jan. 23, 1951; assigned to United States of America (USAEC).

NEWS & NOTES- Five disclosures to the USAEC of alleged inventions, covering the use of fissionable material or atomic energy and fusion of hydrogen for military weapons, had been the basis for a claim for compensation made by Sven Lindequist, Stockholm, Sweden, under the Atomic Energy Act of 1946 (AEN:7/4/50, p.3). All claims have now been disallowed by the USAEC patent compensation board. The board, consisting of Casper W. Ooms, John V. L. Hogan, and Isaac Harter, said last week that the claims were not currently practicable nor useful, nor did they contain operative teaching in the atomic energy field.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

OAK RIDGE, Tennessee- The expanded atomic energy program here has now increased the present population of Oak Ridge almost a thousand since the 1950 census figure of 30,205 was announced last June. Increased activity at K-25, and the forthcoming opening of the K-29 and K-31 plants (all producing uranium-235 by gaseous diffusion), are factors which will add 3,000 more persons this year, officials estimate.

A two weeks course which began here last week in the use of radioisotopes in medical research and therapy has attracted forty-two physicians from half as many states. The course, given by the Oak Ridge Institute of Nuclear Studies, covers such topics as clinical autoradiography; phosphorous-32; radium implantation; colloidal gold and other isotopes; iodine-131; interaction of radiation with matter; radiation safety; radiation laboratory design; dosimetry; and effects of radiation on blood.

The Oak Ridge Summer symposium, Aug. 27-Sept. 6, in nuclear engineering, is expected to cover such topics as basic nuclear engineering, general nuclear power "philosophy", application of the engineering sciences to nuclear technology, and will emphasize nuclear engineering education.

RADIOISOTOPES...tracer and therapeutic applications...

Use could well be made of purified fission products in such industrial applications as sterilization and the production of phosphorescent paints, F. C. Henriques, of Tracerlab, Inc., Boston, told a recent American Chemical Society symposium in New York devoted to radioisotopes. Use would be possible on an economic basis he stated, if the megacurie quantities of radioisotopes available in the vast quantities of fission products produced in modern atomic piles could be supplied industry, in purified form, at a cost of around $5.00 per curie. The only disposition planned for fission products is burial, he observed, although radioisotopes for industrial use can now be obtained only in microcurie quantities. Most promising of the isotopes produced by the fission of uranium are strontium-90, cesium-137, and prometheum-147, Henriques declared, Strontium-90, a strong beta emitter, might be particularly useful in the surface sterilization of foodstuffs; 75 kilocuries of a properly engineered source of this material could sterilize a metric ton of tomatoes per hour. The more penetrating gamma emission of cesium-137 could be used for total sterilization; a 20 kilocurie source of this material would be sufficient to sterilize a metric ton of foodstuffs. Concerning the prometheum fission product, which emits a soft beta radiation, Henriques said it would be ideal as a self-luminous phosphor, and would be much less of a health hazard than the radium now used.

This symposium (above) also heard Paul H. Emmett, Mellon Institute for Industrial Research, who described the uses of radioisotopes in the petroleum industry. He said that these materials were now employed in virtually every operation in that industry, from well drilling to the distribution and use of finished products. He predicted that radioisotopes will be one of the most valuable tools available in the search for methods of producing cheaper and more useful petroleum products.

Radioactive glass beads, manufactured and used in biological studies at Argonne National Laboratory, Chicago, now make it possible to expose very small areas of an experimental animal to extremely large doses of radiation. Since the glass beads can be imbedded in living tissue, their use makes possible the irradiation of an animal's internal organs. In a recent investigation at Argonne, by W. Kisieleski, G. Svihla, and A. M. Brues, beads containing radioactive yttrium were imbedded in the liver of a rat. Sections of tissue were later removed from the area occupied by the bead (after the animal had been sacrificed) and single tissue sections were then obtained which had been exposed to a wide range of radiation dosages. Nearest the bead was the greatest radiation exposure; the amount diminished as the distance from it increased. Prior to the use of these beads, such studies were not possible.

These radioactive beads (above) are made by precipitating the radioactive materials in the presence of finely powdered glass which is then processed. (Five parts of powdered glass to one of radioactive material produces relatively good beads; more perfect ones, though of lower specific activity, result from a ratio of twenty to one.) In making the beads, after the radioactive precipitate is formed, it is thoroughly mixed with the powdered glass, and dried for 15-20 minutes under an infra-red lamp until the mixture has hardened. After bead-size portions are divided off, it is placed into an electric furnace until fusion occurs; twenty to thirty minutes at 2,000 degrees F. has been found adequate.

The new nuclear reactor at Brookhaven National Laboratory, Long Island, will now make it possible to supply certain radioisotopes with very short half-lives, or of higher specific activity, than can be produced in the Oak Ridge National Laboratory reactor. The special irradiation equipment built into the new Brookhaven reactor, and its higher neutron flux, will allow this production of more potent radioisotopes than can be made at Oak Ridge. Requests for radioisotopes must still be made directly to the Isotopes Division, USAEC, Oak Ridge. Service irradiations will not be performed at Brookhaven unless authorized by the Isotopes Division. Inquiries will be handled at Brookhaven by the Laboratory's Isotopes and Special Materials Group.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

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